

AMERICAN SOCIETY FOR TESTING MATERIALS

BULLETIN

260 SOUTH BROAD STREET

PHILADELPHIA, PA.

"Promotion of Knowledge of Materials of Engineering and Standardization of Specifications and Methods of Testing"

Number 80

April 30, 1936

Outstanding Features at Annual Meeting

Nineteen Sessions Will Be Held

THE Thirty-ninth A.S.T.M. Annual Meeting promises to surpass any that have yet been held in the variety and value of the technical features which will be presented. A number of extensive symposiums and groups of papers will be presented, and in order to provide ample time for the presentation of the papers and for discussion, and at the same time to group papers of interest to a particular field in a logical method, nineteen sessions are to be provided. As previously announced, the meeting will extend from Monday, June 29 through Friday, July 3, at Chalfonte-Haddon Hall, Atlantic City.

The rooms in which the technical sessions will be held are the Vernon Room at the ocean end of the Lounge Floor and the Rutland Room on the street side of the first floor just above the Lounge. The A.S.T.M. registration desk will be located in the Lounge Floor parlors. This setup of the registration headquarters and sessions rooms is the same as that which proved so satisfactory for the 1934 annual meeting.

The opening session is scheduled for Tuesday morning, June 30, at 10 o'clock, and will be featured by an address by Dr. H. C. Parmelee, of the McGraw-Hill Publishing Co. and the presentation of the President's address by H. S. Vassar.

Doctor Parmelee, who is so intimately familiar with the chemical engineering industry, will speak on the "Relationship of A.S.T.M. to Modern Developments in Chemical Engineering." He plans to outline the types of problems which may need consideration by the Society as a result of the introduction of new materials and indicate some of the specification and testing problems which may arise from the introduction of these new materials. In the past few years many new materials have been developed by the chemist and subsequently produced on a commercial scale through the work of the chemical engineer, and these developments undoubtedly will influence the trend of much of the Society's work. Doctor Parmelee plans to outline the situation as he views it. He is closely acquainted with the work the Society has been doing in the standardization and research

field, and from his long experience as an editor and editorial director he is in a splendid position to discuss some of the problems, both present and future.

A graduate of the University of Nebraska and recipient of a Doctor of Science degree from Colorado College, he has since 1905 been occupied with the editing of technical and business journals. He was editor of the *Western Chemist and Metallurgist*, 1907-1910, western editor, *Chemical and Metallurgical Engineering*, 1910-1916; president, Colorado School of Mines, 1916-1917; and editor, *Chemical and Metallurgical Engineering* in New York until 1928 when he became editorial director of McGraw-Hill publications. He has been vice-president of this organization and is now serving as editor, *Engineering and Mining Journal*.

Monday has been left open for numerous meetings of Society committees and additional committee meetings may be held on Thursday afternoon which is otherwise reserved for recreation, including the annual golf tournament. It will be noted that no technical session is scheduled for Friday evening, the closing sessions on ceramics, building materials, paint and a second session on non-ferrous metals being held on Friday afternoon.

The Edgar Marburg Lecture will be delivered on Wednesday afternoon at 4 o'clock by Dr. Arthur L. Day, Director, Geophysical Laboratory, Carnegie Institution of Washington, on the subject "Developing American Glass." Doctor Day has taken a leading part in this important work as indicated in his biographical sketch which appears on page 3.

The Provisional Program, listing all the papers and reports that will be presented at the meeting, is included in this issue. This is the only place where this program will appear prior to the meeting and special attention is called to the fact that it includes synopses of the various items that are scheduled for the meeting.

SYMPOSIUM ON RADIOGRAPHY AND X-RAY DIFFRACTION

The outstanding technical feature of the meeting will be the Symposium on Radiography and X-ray Diffraction being developed by Subcommittee VI on X-ray Methods of

A REQUEST BLANK is enclosed for Members' use in securing Preprints.

HOTEL RESERVATIONS should be made promptly



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A.S.T.M. Committee E-4 on Metallography. With the exception of the Symposium on Effect of Temperature sponsored jointly by the A.S.M.E. and the Society in 1931 in Chicago, the X-ray Symposium will be the most extensive of any the Society has yet developed and it will be noted from the Provisional Program that four separate sessions are devoted to it. The symposium is divided into two sections, dealing with radiography and diffraction, with six extensive technical papers by outstanding authorities in their respective fields listed for each section. The two sessions devoted to radiography, the Third and Fourth, are scheduled for Tuesday afternoon and evening, to be followed by the Seventh and Eighth sessions devoted to the diffraction section, on Wednesday morning and afternoon.

A study of the Provisional Program is of course the best way of getting a complete picture of this symposium and of the technical program as a whole. The synopses of the

X-ray papers give some idea of the fields to be covered and it will be noted that while the majority of the papers apply to metals, there are several papers dealing with important and significant applications of X-rays in the non-metals field.

Up to this time there has never been in an English-speaking country a symposium on the use of X-rays in the examination of materials, and while the Germans have held yearly symposiums on the subject and published certain vol-

umes which are useful for those who can read German, it is anticipated that the publication comprising the extensive papers and discussion to be given in the A.S.T.M. symposium will serve a most useful purpose.

The general tenor of the symposium, as conceived by the committee in charge, is one of the usefulness of X-ray methods in the examination of materials.

Dr. R. F. Mehl, Director, Metals Research Laboratory, and Head, Department of Metallurgy, Carnegie Institute of Technology, who is chairman of E-4's Subcommittee VI is responsible for initiating the symposium and for its direction. Cooperating very closely with Doctor Mehl and in charge of the development of the Section on Radiography (Doctor Mehl serving in a similar capacity for the Section on Diffraction) is Dr. H. H. Lester, Research Physicist, Watertown Arsenal. Dr. J. T. Norton, Associate Professor of Metallurgy, Massachusetts Institute of Technology, Dr. C. S. Barrett, Carnegie Institute of Technology, and Dr. K. R. Van Horn, Research Metallurgist, Aluminum Company of America have also been active in the work.

TESTS FOR EVALUATING RUBBER PRODUCTS

Another technical feature of the meeting that promises to be of widespread interest is the Symposium on the Limitations of Laboratory and Service Tests in Evaluating Rubber Products, which is being developed by A.S.T.M. Committee

D-11 on Rubber Products, headed by H. A. Depew, Research Chemist, American Zinc Sales Co., with Arthur W. Carpenter, Manager of Testing Laboratories, The B. F. Goodrich Co., as secretary. The five papers comprising this symposium, which will be held on Thursday evening in the Fifteenth session, have for their primary purpose the clarification of how far laboratory tests can be used as a guide for purchasing specifications and showing how far it is necessary to rely on service experience and the reputation of the manufacturer.

Each of the authors has prepared his paper on the premise that the papers will be of broad general interest and will not be highly detailed in rubber technology. With the widespread and growing applications of rubber products, it is expected that the symposium will be of much value.

WATER; SPECTROGRAPHIC ANALYSIS

A session devoted entirely to papers and reports on the subject of water, particularly boiler feed waters, is scheduled for Tuesday evening, being sponsored by the Joint Research Committee on Boiler Feedwater Studies and A.S.T.M. Committee D-19 on Water for Industrial Uses. Certain of the papers will announce latest results of extensive research programs being carried on under the auspices of the Joint Committee of which the Society was recently made one of the sponsors. In the development of this program, C. H. Fellows, Detroit Edison Co., chairman of the Joint Committee and Max Hecht, Consulting Chemical Engineer, chairman of Committee D-19, have taken the lead.

Following the successful Symposium on Spectrographic Analysis sponsored by Committee E-2 on this subject at the 1935 annual meeting, another session is scheduled for this year's annual meeting to be held on Wednesday evening. As the program indicates, several papers are included dealing with important phases of this subject.

FAILURE OF BRIDGE WIRE

One of the high lights of the meeting is scheduled for the session on iron and steel, to be held Thursday morning, in the paper on "Failure of Suspension Bridge Cable Wire" by W. H. Swanger and G. F. Wohlgemuth, National Bureau of Standards, Washington, D. C. This paper will present the results of several years extensive work carried on by the

Chalfonte-Haddon Hall, Boardwalk and Beach



Bureau to determine the cause of failure of the heat-treated wire used in the Mount Hope suspension bridge, and to answer the question why the cold-drawn wire which was substituted for the heat-treated material after the bridge was dismantled is satisfactory. This paper will clear up a perplexing mystery which has puzzled the engineering profession for many years.

OTHER FEATURES

It will be noted from the program that a real effort has been made to avoid scheduling sessions which might be on subjects of conflicting interest. Two sessions are to be devoted to papers and reports dealing with problems in the cement and concrete fields, these sessions being scheduled for Thursday morning and evening. Several interesting papers and committee reports comprise the two sessions, Friday morning and afternoon, devoted to non-ferrous metals, the morning session including several technical discussions on copper wire. Full details of these and the other sessions are given in the program.

The Dudley Medal will be awarded to H. C. Mann, Research Engineer, Watertown Arsenal, on Wednesday afternoon following the Marburg Lecture.

PREPRINTS-SENT ON REQUEST

With this BULLETIN there is enclosed to each A.S.T.M. member in good standing a preprint request blank by which he can request a copy of any of the technical papers and reports preprinted in advance of the meeting. This blank should be returned promptly and should be carefully marked, with the signature and mailing address of the member clearly indicated. The Provisional Program will enable members to make a selection of the items desired. Preprints will be forwarded to the members, probably in three installments. *Each member should note that preprints will not be sent unless requested.*

HOTEL RESERVATIONS AND ADVANCE REGISTRATION

It is desirable that all members should make their hotel reservations promptly using for this purpose the return blank, addressed to the hotel management, which is enclosed with this BULLETIN. Rooms can be secured on either the American or European plan at the special rates listed on the return blank. Since Chalfonte and Haddon Hall each has its own dining room service, members who wish to dine together should secure accommodations in the same division of the hotel, particularly if they are registered on the American plan.

In order to expedite registration of members as they arrive at the meeting, it is desirable to have as many registration details as possible taken care of in advance and it will be very helpful if members will fill out and mail promptly to Society Headquarters the enclosed advance registration card.

REGISTRATION PROCEDURE

Members and visitors should register at the A.S.T.M. desk as promptly as possible after their arrival at the hotel. Each member will receive the usual badge and preprint copies of any of the reports and papers desired. The members' registration fee is \$1. Visitors will receive the badge and may secure preprints for any two sessions of the meeting. The

visitors' fee is \$1, but if a complete set of preprints is desired they may procure them with a payment of \$1 additional.

RAILROAD RATES

Because of the present uncertainty concerning railroad passenger rates occasioned by the recent I.C.C. action, no decision has been made by the various passenger associations concerning convention reduced rates. The Society has filed its application for rate reductions and further announcement on this subject will be made to each member through a Circular Letter, to be sent in May. This will give additional details of the meeting.

Arthur L. Day—Marburg Lecturer

THE Eleventh Edgar Marburg Lecture will be delivered at the 1936 A.S.T.M. annual meeting at Chalfonte-Haddon Hall, Atlantic City, by Dr. Arthur L. Day, Director, Geophysical Laboratory, Carnegie Institution of Washington. Doctor Day, who is an outstanding authority on the subject of glass technology, plans to discuss the subject "Developing American Glass." In this work, as indicated below, Doctor Day has taken a leading part.

Doctor Day was born in Brookfield, Mass. He received his A.B. degree from Yale University in 1892 and his Ph.D. in 1894. He has received Doctor of Science degrees from Groningen, 1914; Columbia, 1915; and Princeton, 1918. Following a short period, 1894-1897, as Instructor in Physics at Yale, he was a member of the Scientific Staff, Physikalisch-Technische Reichsanstalt, Charlottenberg, Germany. For the next six years he was Physical Geologist, U. S. Geological Survey, and when the Geophysical Laboratory was founded in 1906, he was appointed director, the position he has held since that time.

During the war period, Doctor Day had charge of American optical glass development, reporting to the War Industries Board. During the war about 97 per cent of all optical glass used by American forces was made under the supervision of Geophysical Laboratory men. Doctor Day has been chairman of the Advisory Committee on Seismology of the Carnegie Institution of Washington, which in 1921 founded the Seismological Laboratory in Pasadena for the study of local earthquakes.

A member of numerous scientific bodies, he was Home Secretary, 1913-1918, and later Vice-President of the National Academy of Sciences. He was President, 1924, of the Washington Academy of Sciences, and his memberships include the Geological Society of America, American Physical Society, and the American Chemical Society. In 1923 Doctor Day was awarded the John Scott Medal. His clubs include the University, of New York, and the Cosmos, in Washington.



Arthur L. Day



DISTRICT COMMITTEE ACTIVITIES

Meeting in Chicago

AT THE dinner meeting of members in the Chicago District held at the Chicago Engineers' Club on April 8, Prof. D. B. Keyes of the University of Illinois spoke on "Value to the Industries of the Exact Determination of Physical and Chemical Properties." President Vassar and Secretary-Treasurer Warwick were present at the meeting and each gave a talk on Society work. About 75 members and their friends were in attendance. W. A. Straw, chairman of the Chicago District Committee presided at the meeting.

President Vassar commented on the improved outlook for the Society as indicated by an increase in the membership and the formation of several new committees. It was his opinion that many of the older industries, which were formerly run by rule of thumb methods, would be looking for technical assistance and that they would turn to the Society for much of this assistance. However, he pointed out that

CHICAGO
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Chairman
W. A. Straw Secretary
G. C. D. Lenth

it would be easy for the Society to go beyond its depth in these matters and that new projects should be approached with caution and that the field of new committees should be well defined and closely supervised during their first few years.

Secretary-Treasurer Warwick substantiated Mr. Vassar's comment on the outlook of the Society by a number of statistics. He outlined briefly the high lights of the coming annual meeting, which promises to be one of the most interesting in the history of the Society.

Professor Keyes illustrated the "Value to the Industries of the Exact Determinations of Physical and Chemical Properties" by citing several important industrial problems that had been solved by these methods. Among them were the causes and cures for embrittlement in boiler plates, the corrosion in boiler economizer tubes due to sulfur dioxide, and the progress being made in the work on catalysis. He stressed the importance and the difficulties frequently encountered in obtaining on a laboratory scale, exact duplication of the conditions existing in the plant. Interesting examples of the value of minor constituents, frequently considered as impurities in commercial products, were discussed.

Carleton Ellis Gives Talk in New York

ON the evening of April 21, a group of about 300 members of the Society, most of whom were from the New York area, and guests, heard an interesting "lantern slide

talk" by Mr. Carleton Ellis on the subject of synthetic resins, in which field he is an outstanding authority. On the speaker's table was an attractive array of dozens of articles of varicolored moldings and castings of the prominent types of commercial plastics. The local chairman, Dr. M. F. Skinker, introduced both Mr. Ellis and President H. S. Vassar, who preceded Mr. Ellis with a short talk regarding aims and purposes of the Society. He commented particularly on the marked activity this year of the several District Committees.

Mr. Ellis used about 100 pertinent and interesting lantern slides to illustrate his talk. Some pertained to the chemistry of the synthetic resins, with mention of structural formulas. He discussed various types of resins or plastics, such as phenol-formaldehyde, urea formaldehyde, vinyl polymers, glyceryl phthalates, isoprene, acrylic acid derivatives, etc. To add to the general interest of the audience, these slides were interspersed with others showing methods of manufacture of the resins and their uses in homes and industries. The desirability of creating long chain molecules for "building" synthetic resins was discussed and mention was made of a substance of a molecular weight of 440,000 existing as a colloid almost visible under the microscope.

About one hundred million pounds of synthetic resins are produced annually. The ultimate consumer uses them in the form of moldings, laminated moldings, castings, coatings, ingredients in varnishes and paints, etc. Products shown were: buttons, valves, furniture handles, wall panels, laminated gear wheels, electric light reflectors, phonograph records, a weighing scale housing or box, ornamental novelties, chemical equipment, etc.

Mr. Vassar mentioned that at present the only A.S.T.M. standards dealing with plastics come under A.S.T.M. Committee D-9 on Electrical Insulating Materials and covers the

NEW YORK
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Chairman
M. F. Skinker Secretary
L. C. Beard

testing of molded materials used for electrical insulation.

Toward the close of the evening samples were distributed with the compliments of the manufacturers of Catalin, Du-prene, Thiokol and Unyte.

Addresses Wanted

ANYONE knowing the present address of either of the following members, whose last known addresses are given below, is asked to notify the Secretary-Treasurer:

W. P. HENDERSHOT, Standards Engineer, General Motors Truck Corp., South Boulevard Plant, Pontiac, Mich.

ERNEST PERRY BRADLEY WILSON, Chief Chemist, Municipal Council, Electricity Dept., Box 404, Shanghai, China.



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April, 1936

DISTRICT COMMITTEE ACTIVITIES

Splendid Meeting in Detroit

THE Detroit District Committee was host to A.S.T.M. members and their friends in the vicinity of Detroit, at a dinner meeting on April 7 at the Hotel Fort Shelby. Dinner was served to two hundred at 7 p. m. and at 8:30, W. H. Graves, chairman of the Detroit District Committee formally opened the meeting to about four hundred guests.

The toastmaster of the occasion was Malcolm W. Bingay, well-known Editorial Director of *The Detroit Free Press*. In his characteristic fashion Mr. Bingay commented upon politics and the New Deal, decrying the lack of test methods by which aspirants to political offices could be judged before they were selected, and left the impression that perhaps politicians should be considered as a sort of industrial material and as such be given some thought by the Society.

Mr. Bingay introduced President Hervey S. Vassar who briefly discussed the opportunities now open to A.S.T.M. to serve industry, and the opportunities open to industry to become identified with the Society.

Mr. Warwick presented certain Society statistics indicating encouraging growth in membership and value of the work to industry. He outlined the activities scheduled for the current year and discussed briefly the plans for the annual meeting in June.

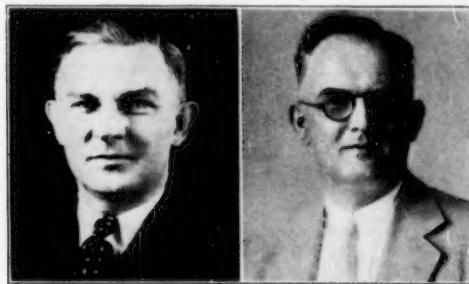
The principal speaker of the occasion was Dr. John Johnston, Director of Research for the United States Steel Corp. His subject "The Use and Abuse of Tests" emphasized many points about testing which investigators and analysts frequently overlook. A few of the points Doctor Johnston brought out are outlined here, but it is hoped that his complete talk, which was a most interesting one and very pertinent from the standpoint of work of the Society, can be published in full in a forthcoming issue of the BULLETIN.

He stressed the necessity of a knowledge of the complete history of samples, illustrating his remarks with slides showing the changes produced in test values by slight and often neglected modifications in samples. His remarks were confined chiefly to the examination and testing of steel; but in a striking manner he illustrated the effect of service on the coefficient of expansion of fire brick, and the false conclusions that would result from the determination of this property on a new brick, when in service, one end of the brick subjected to higher temperatures than the other would give values for this property much higher than the cooler end. The emphasis was put on the relation of test procedures and conditions to those conditions likely to be encountered in service.

Doctor Johnston pointed out the difficulty of evaluating correctly the addition to liquid steel of deoxidizers or of admixtures of alloying elements intended to improve some quality or other of the finished steel. While in many cases such additions made to a single heat appear to yield a steel improved in some respect, one must be cautious before attributing any such improvement to the alloy element alone. Included in the reasons for such caution is the fact that until recently it has not always been practicable to make two heats of nominally identical steel which were in fact identical in all respects during the finishing stages of the heat. Furthermore, the quality of the steel cannot be gaged as a rule until

it has been put through a whole series of finishing operations. As a third reason he pointed out that unless the improvement is very marked it will not be established by most of the tests now employed as a measure of the quality of steel. These uncertainties indicate that the effect of material added to liquid steel cannot be gaged accurately until one has made a number of heats, controlled the fabrication of the product as closely as possible, carefully examined representative samples of the finished steel from the several heats by the best tests available, and compared the results with those of identical tests made on heats identical in every respect except that the material in question was not added.

DETROIT
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Chairman
W. H. Graves Secretary
C. H. Fellows

In this connection Doctor Johnston discussed accelerated tests. He pointed out that too frequently accelerated tests induced into the specimen under examination characteristics totally unlike those that would develop in service and hence yield test results of doubtful value when used to predict useful life. Although he did not flatly condemn accelerated tests—he had reference to the salt-spray test for corrosion resistance—he did state that he suspected a great deal more was needed to be known about such tests before intelligent interpretation of results could be made.

Conference on Soil Mechanics

IN ORDER to collect and coordinate information in the field of soil mechanics and to prepare for future cooperation, an International Conference on Soil Mechanics and Foundation Engineering has been organized. The first meetings of this conference are to be held from June 22 to 26 inclusive, in the Graduate School of Engineering, Harvard University, Cambridge. As announced in the March BULLETIN, C. A. Hogentogler, Senior Highway Engineer, U. S. Bureau of Public Roads, who is acting chairman of the Standing Committee on Soils for Engineering Purposes, which is in course of organization, and W. S. Housel, Assistant Professor of Civil Engineering, University of Michigan, have been designated as the representatives of A.S.T.M. at this conference.

The purposes of the conference are primarily (1) to make a survey of investigations in progress in the various soil mechanics laboratories, (2) to collect information on recent developments in earth and foundation engineering and make them available, (3) to compare and coordinate experiences and results of research, and (4) to initiate closer cooperation in advancing scientific methods in this branch of engineering.



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Number 80

April 30, 1936

Annual Meeting Near

BEFORE many weeks the biggest event of the Society's year, the Thirty-ninth Annual Meeting, will be in full swing at Atlantic City. It promises to be one of the most interesting ever held with an unusually strong technical program. Since the 1935 annual meeting, a successful regional meeting has been held in Pittsburgh with enthusiastic local meetings in Philadelphia, Cleveland, Los Angeles, Chicago, Detroit and New York. The success of these meetings augurs well for this year's big event.

The Provisional Program and announcements in this BULLETIN are intended to give a preview of what is to be expected. This year there are several more technical papers and reports on the program than for the past few years. Despite this fact, no sessions are scheduled for Friday evening, and all day Monday and Thursday afternoon have been made available for committee meetings.

The nineteen sessions have been very carefully planned so that ample time will be available for presentation of the various items. The committee officers will ask action on their reports as a whole rather than on each individual recommendation, this plan following that successfully used for the past few years, and will devote some of the time saved to a story of interesting features of committee work which may not be detailed in the preprinted report. Efforts will be made to preprint as many of the items as possible. With preprints distributed, and available at the meeting, the authors of the papers will plan to outline the high lights of their contribution and not read the paper in detail.

All the things that go to make a successful meeting—symposiums, discussion, committee meetings, Marburg Lecture, Dudley Medal Award and the others are being developed to insure the ultimate success of this annual gathering of our members and their guests. All these features are only a few weeks away. Plan now to be there.

Let's Try for a New High

IN a few short weeks we shall be gathering once more in Atlantic City for the Thirty-ninth Annual Meeting of the Society. The Provisional Program presented in this issue of the BULLETIN promises as usual a full week of papers, discussions, and committee reports. Though there will be no exhibits this year such as created so much interest at Detroit, there will be plenty to do and plenty to hear.

We are all looking forward to the address by Doctor Parmelee at the opening session and Doctor Day's Marburg Lecture on American Glass.

Of course the "regulars" will be out in force, but a special invitation is extended to our many new members to be present at the meeting, to enjoy its sessions, to become more fully acquainted with the many phases of the Society's work, to meet their fellow members personally, and to find places in the Society's activities.

Past records of attendance and interest will be hard to surpass but let's try for a "new high."



President

New Committee on Soap

AS A result of extensive studies by the special committee appointed in 1935 by the Executive Committee, to consider the desirability of the Society forming a standing committee on soap, a new standing committee on soap and other detergents is in process of organization. The committee will undertake the development of standard specifications applying to soap and other detergents.

Soap products are used in a great many industries for various purposes. In the automotive field soap is used for cleaning before refinishing and after rubbing down, and also for coating the spraying booths. Brush makers use soap in scouring and softening the fibers, while in the foundry industry use is made of soap on the inside of molds to aid stripping. In the paper industry use is made of soap products for washing paper machine felts, as well as rosin soap for sizing.

While the exact scope of the new committee and definite delineation of its activities will be decided by the committee at its organization meeting, the special committee in charge of organization has indicated that at first its work could be limited chiefly to soaps in general (liquid, cake, powder, etc.) soap powders and cleansers. The committee later may undertake development of standards for other detergents, investigate the question of detergency itself and oils used in soap making.

The organizing committee which is developing the personnel, is headed by H. P. Trevithick, Chief Chemist, New York Produce Exchange. In this new work, the Society will cooperate closely with other organizations who have undertaken certain standardization activities, including test methods, so that there may not be unnecessary duplication of effort.



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Nominations for Officers

THE Nominating Committee to select nominees for Society officers met in Pittsburgh during Committee Week. The personnel of this group was listed in the March BULLETIN. In accordance with the provisions of the By-laws of the Society, the following nominations for officers are announced:

For President:

A. C. FIELDNER, Chief Engineer, Experiment Stations Division, U. S. Bureau of Mines, Washington, D. C.

For Vice-President:

T. G. DELBRIDGE, Manager, Research and Development Dept., Atlantic Refining Co., Philadelphia, Pa.

For Members of Executive Committee:

O. U. COOK, Inspecting Engineer, Tennessee Coal, Iron and Railroad Co., Birmingham, Ala.
H. F. GONNERNAN, Manager, Research Laboratory, Portland Cement Assn., Chicago, Ill.
C. S. REEVE, Manager, Research Development, The Barrett Co., Leonia, N. J.
F. E. RICHART, Research Professor of Engineering Materials, University of Illinois, Urbana, Ill.
F. M. WARING, Engineer of Tests, Pennsylvania Railroad Co., Altoona, Pa.

Each of the above nominees has indicated in writing his acceptance of his nomination. The By-laws provide that "further nominations, signed by at least 25 members may be submitted to the Secretary-Treasurer in writing by May 20, and a nomination so made, if accepted by the member nominated shall be placed on the official ballot" which "shall be issued to the members between May 20 and June 1."

Committee on Soils Being Organized

THE Executive Committee has authorized the formation of a new standing committee with the tentative title "Soils for Engineering Purposes" and the development of this committee is progressing. As a result of extensive work on the part of the Subcommittee on Soils for Highway Construction of A.S.T.M. Committee D-4 on Road and Paving Materials, there were issued in 1935 nine methods of testing soils. While these relate to highways, they are for the most part of wider application. While the title, scope and other details of the new committee have not yet been definitely determined it is expected to take over the work previously carried on by the D-4 subcommittee.

A survey made in 1932 indicated that more than half of the states relied in varying degree on subgrade properties as factors in highway design and some 13 of these had laboratories equipped to perform various routine tests including those suggested by the U. S. Bureau of Public Roads. A great deal of work has been done recently by various branches of the Government in connection with foundation surveys for huge dams now being built. There is a growing appreciation of the importance of adequate knowledge of soils in construction and related work and it is believed that the Society can render a definite service in undertaking standardization work in this field. C. A. Hogentogler, Senior Highway Engineer, U. S. Bureau of Public Roads, who is chairman of the Subcommittee on Soils for Highway Construction of Committee D-4 has been appointed the temporary chairman of the new standing committee.

Committee on Building Units Meets

COMMITTEE C-10 on Hollow Masonry Building Units, at a meeting held in Washington, D. C., in March, voted to abandon the use of values of water absorption as designations for the various classes of structural clay tile. For load-bearing tile the class formerly designated as 5-16 will now be designated as LBX and that formerly as 16-25, as LB. The intended use of these two classes has been defined in terms which are believed to be more useful to the builder. The use of tile classed as LBX is not restricted whereas those classed as LB are intended for use only where not exposed to severe frost action.

It is planned to revise the Tentative Specifications for Structural Clay Load-Bearing Wall Tile (C 34 - 35 T) by deleting the requirements for minimum weights for tile and substituting therefore requirements for the thicknesses of the shells and webs. Specifications C 56 - 35 T for non-load-bearing tile and C 57 - 35 T for floor tile are to be revised by changing the class designations without changing significantly the technical requirements.

The committee also gave consideration to methods of preparing specimens for compression tests. The data available were reviewed and it was concluded that the methods of capping bonding tile with irregular bearing surfaces should be revised. Although the data available are not adequate to serve as a basis for preparation of methods of test which will correct all the faults of the present method, there are definite indications that the revisions recommended will result in obtaining values for strength more indicative of the service value of the products.

The committee voted to recommend to the Society the adoption as standard of the tentative specifications mentioned above, relating to structural clay tile, and also the Tentative Specifications and Tests for Load-Bearing Concrete Masonry Units (C 90 - 34 T).

Article on Castings

AN INTERESTING article was recently prepared by Major R. A. Bull, Consultant on Steel Castings, on the subject "Recent Developments Affecting the Testing Society's Specifications for Steel Castings." This article appeared in *Metals and Alloys*, comprising three installments, the first published in the January, 1936, issue. Major Bull, who is chairman of the special committee of the Steel Committee's Subcommittee VIII on Steel Castings, has taken a leading part in modernizing the casting specifications in the charge of this committee and the various recommendations are now being balloted upon by the Steel Committee for presentation at the Society's annual meeting in June.

Major Bull's purpose in preparing the article was prompted by the belief that two important metallurgical problems which are under consideration and which have not yet been solved with reference to A.S.T.M. specifications should be brought to the attention of a large number of technologists whose advice would be helpful in reaching a solution. One of these problems is that of chemical composition as related to weldability and the other problem concerns the effect of prolonged heating in influencing physical properties—this heating may be applied either when the test coupon is poured with the casting, or when the casting with the coupon is annealed, or in both cases.



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NEW MEMBERS TO APRIL 23, 1936

The following 34 members were elected from March 18, to April 23, 1936:

Company Members (3)

AMERICAN RADIATOR Co., D. H. Meloche, Chief Metallurgist, 8007 Jos. Campau Ave., Detroit, Mich.
COLUMBIA STEEL Co., John Disario, Metallurgist, Torrance, Calif.
CORN PRODUCTS SALES Co., Curry Watson, Manager, Textile Division, 17 Battery Place, New York City.

Individual and Other Members (28)

ARMSTRONG, T. N., Metallurgist, The International Nickel Co., Inc., 67 Wall St., New York City.
BELZ, C. J., University of Dayton, Dayton, Ohio.
BISCHOFF, PAUL, Chief Chemist, Aetna Portland Cement Co., Essexville, Mich.
BLAIR, W. J., Mechanical Engineer, Canada Cycle and Motor Co., Ltd., Weston, Ont., Canada. For mail: 104 Mountview Ave., Toronto, Ont., Canada.
BOYLE, C. L., Chemical Engineer, 3777 Bellevue, Detroit, Mich.
CARSON, CLARENCE, Sales Manager, Automotive and Industrial Divisions, Rinshed-Mason Co., 5935 Milford St., Detroit, Mich.
CATHER, C. H., Assistant Professor of Mechanics, West Virginia University, Morgantown, W. Va. For mail: 815 Price St., Morgantown, W. Va.
COLLINS, B. O., Chemist, City Hall Bldg., Rock Island, Ill.
CUTTS, H. E., Vice-President and Treasurer, Stillwell & Gladding, Inc., 130 Cedar St., New York City.
DECAMP, R. E., Engineer, Consolidated Steel Corp., Ltd., Box 1348, Arcade Station, Los Angeles, Calif.
DEWITT, F. J., JR., Eastern Representative, Parker Rust-Proof Co., Detroit, Mich. For mail: 1461 Lincoln Bldg., 60 E. Forty-second St., New York City.
DIRECCIÓN NACIONAL DE VIALIDAD, BIBLIOTECA, J. Allende Posse, President, San Martin 871, Buenos Aires, Argentina.
DOUGLAS, M. S., Professor of Civil Engineering, Case School of Applied Science, Cleveland, Ohio.
DUNN, J. A., President, Hume Pipe Co. of New England, Inc., Box F, Swampscott, Mass.
HORROCK, R. H., Bundy Tubing Co., Detroit, Mich. For mail: 12001 E. Jefferson St., Detroit, Mich.
JUDSON, H. H., Foundry Superintendent, Goulds Pumps, Inc., Seneca Falls, N. Y.
KELLER, G. E., Manager, Commercial Testing and Engineering Co., Box 832, Charleston, W. Va.
KLINGER, J. D., Chrysler Corp., Detroit, Mich.
MAAG, O. L., Chief Chemist, Timken Roller Bearing Co., Canton, Ohio.
MATTHEWS, RUSSELL R., Superintendent, The Firth Carpet Co., Firthcliffe, N. Y. For mail: Cornwall-on-Hudson, N. Y.
MC ELWEE, R. G., Vanadium Corporation of America, 2440 Book Tower, Detroit, Mich.
PULLAR, R. T., Marketing Research, 1440 Broadway, New York City.
RODGERS, WILLIAM, Metallurgical Engineer, Republic Steel Corp., Buffalo, N. Y.
SIMONS, E. J., President, General Machinery Co., 3500 E. Riverside Ave., Spokane, Wash.
SMITH, H. VERNON, Technical Director, McDougall-Butler Co., Inc., 24 Evans St., Buffalo, N. Y.
VOUKIDIS, T. AI., Chief, Combustible Materials Dept., General State Laboratory, Athens, Greece.
WECKER, W. A., Assistant General Manager, McKinnon Industries, Ltd., St. Catharines, Ont., Canada.
WITHERS, E. G., President, Elmer G. Withers Architectural Co., Inc., 402 Mid-Continent Bldg., Fort Worth, Tex.

Junior Members (3)

KROMER, O. W., Research Engineer, Lewis Bolt and Nut Co., 504 Malcolm Ave., S. E., Minneapolis, Minn.
LUERTZING, PAUL, Secretary, Ace Glass, Inc., Box 349, Vineland, N. J.

Committee D-9 Has Active Meeting

AT A two-day session on March 19 and 20 in New York City, Committee D-9 on Electrical Insulating Materials completed extensive work on revisions of standard and tentative specifications and tests and there was important discussion at the main committee and subcommittee meetings centering around such items as test cells for power factor and resistivity measurement of insulating oils, dielectric strength test of sheet and tape material, and conditioning requirements.

In connection with insulating oils, Committee D-9 has been attempting to secure a suitable test cell which would be inexpensive but at the same time accurate and convenient to use. Several types of cells have been compared and the laboratory results prompted considerable discussion. This involved the extremes in accuracy which might be desired by different interests such as cable oil manufacturers, cable manufacturers and operating companies. There is no doubt but that these discussions and tests are bringing to light the desired information concerning the exactness of the present knowledge and limitations of equipment and measuring devices for power factor and resistivity of liquid insulation.

The committee is proposing a complete revision of the Tentative Methods of Testing Electrical Insulating Materials for Power Factor and Dielectric Constant (D 150 - 35 T). In this revision, the limits of accuracy of the different methods recommended are discussed. In order to summarize and interpolate the large amount of data on life tests collected by Subcommittee IV on Insulating Mineral Oils, the chairman, E. A. Snyder, Socony-Vacuum Oil Co. and F. M. Clark, Physicist, General Electric Co. have prepared a paper for presentation at the A.S.T.M. annual meeting in Atlantic City. (See Provisional Program.) This subcommittee announced it is now ready to undertake round-robin tests to determine gas content of insulating oil.

A round-robin series of tests is to be undertaken in connection with the development of standard molds for use in testing molded materials. Another round-robin test is in progress dealing with power factor measurements of natural mica. This work is one of considerable technical difficulty and the committee now feels that it has developed a method due to the application of pressure on the electrodes which appears very promising. Under the sponsorship of Subcommittee III on Plates, Tubes and Rods, a test series to study heat distortion of insulating plates is to be started and this subcommittee plans other tests in connection with identifying grades.

One activity of Subcommittee VIII on Papers and Fabrics has to do with the dielectric strength of tape material. The A.S.T.M. requirements have been criticized and study of the situation has resulted in definite work on the part of Committee D-9 to attempt to provide a method which will be satisfactory to all concerned.

McCONNELL, M. E., Architect, 191 Winona Ave., Highland Park, Mich.

Correction

John W. Lohnes, whose membership was reported in the March ASTM BULLETIN, is Special Representative of the Vanadium Corporation of America.



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Provisional Program

THIRTY-NINTH ANNUAL MEETING

of the

AMERICAN SOCIETY FOR TESTING MATERIALS

ATLANTIC CITY, N. J.

CHALFONTE-HADDON HALL

JUNE 29-JULY 3, 1936

Monday, June 29

Open

Committee Meetings

Tuesday, June 30 10 A.M.

First Session

Opening Session

Formal Opening of the Thirty-ninth Annual Meeting. President H. S. Vassar.

Report of Committee E-10 on Standards. Cloyd M. Chapman, Chairman.

Reports on specifications and methods of test submitted under the procedure for acceptance and publication of new and revised tentative standards and tentative revisions of existing standards in the interim between annual meetings of the Society. Reports on new standing committees being organized on soaps and detergents, paper and allied products, and mechanics of soils. Reviews standardization projects considered during the year.

Report of Committee E-9 on Research. P. H. Bates, Chairman.

Contains a brief summary of research activities and the work of the several research committees of the Society.

Annual Report of the Executive Committee. C. L. Warwick, Secretary-Treasurer.

A general report of Society activities with particular reference to membership, publications, finances and administrative matters relating to committee activities and inter-society relations.

Address: "Relationship of A.S.T.M. to Modern Developments in Chemical Engineering." H. C. Parmelee, Editor, Engineering and Mining Journal, McGraw-Hill Publishing Co., Inc.

Annual Address by the President. H. S. Vassar.

Introduction of Newly Elected Officers.

The terms of the new officers, under the provision of the By-laws, begin at the close of the annual meeting.

Miscellaneous Business.

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Tuesday, June 30 2 P.M. Second Session

Held Simultaneously with Third Session

Fuels, Petroleum Products, Electrical Insulating Materials

Report of Committee D-9 on Electrical Insulating Materials. T. Smith Taylor, Chairman.

Presents the modified Baader method for determining the saponification number of electrical insulating oils for publication as tentative. Includes a complete revision of the tentative method of testing

electrical insulating materials for power factor and dielectric constant, containing an improved procedure which is considered more general and fundamental. Submits a completely revised tentative method of test for determining the electrical insulating qualities of slate. Proposes revisions of the following tentative standards relating to electrical insulating materials: methods of testing varnishes; tests for solid filling and treating compounds; for untreated paper; for sheet and plate materials; for testing varnished cloths and varnished cloth tapes; for grading natural mica; for thickness of solid electrical insulation, and specifications for black bias-cut varnished cloth tape. Recommends adoption as standard of the tentative methods of testing pasted mica; also adoption of the existing tentative revision covering test for specific gravity in the standard methods of testing electrical insulating oils.

Edge Correction in the Determination of Dielectric Constant. H. L. Curtis and A. H. Scott, National Bureau of Standards.

Discusses the common cases for each of the following arrangements and gives for each case a method by which the edge correction can be determined: 1. A circular plate of dielectric with coaxial circular electrodes on the faces. 2. Two circular plates of dielectric with coaxial circular electrodes on the faces of each, and with the plates pressed together so that the two inner electrodes act as a single electrode.

The Problem of Preparing Suitable Shellac Specimens for Electrical Tests. W. H. Gardner, Ernst Weber and Erik Ackerlind, Polytechnic Institute of Brooklyn.

Reviews the different methods for preparing test specimens of insulating varnishes from the point of view of their applicability to shellac and discusses the effect of uniformity, film thickness, "orange peel," alcohol retention and moisture adsorption. Considers the problem of preparing suitable specimens from molten lac, which problem has not been covered by the various standardizing bodies, and is one which involves the effects of polymerization and the internal evolution of water through chemical condensation reactions.

Significance of Material Tests and of Design Tests upon Electrical Insulating Materials. L. E. Barringer, General Electric Co.

Discusses the lack of clarity upon this subject and points out in detail the relative significance and value of material (A.S.T.M.) and design tests upon porcelain, touching upon physical, chemical and electrical tests and particularly emphasizing the effect upon dielectric value of varying or complex physical strains. The same principles also apply to molded materials, laminated materials, varnishes and liquid insulating materials. In conclusion states that neither laboratory nor design tests are all-sufficient; that both are essential for the proper evaluation and selection of insulating materials and that therefore users are not justified in using exclusively either one or the other as definite purchasing specifications.

Effect of Moisture Content of Specimens on Results of Compressibility Test for Molded Sheet Materials. W. A. Evans, Bell Telephone Laboratories, Inc.

Discusses the loosening of molded sheet insulating materials in construction due in part to deformation under pressure and with most materials to changing dimensions with changes in moisture content as the atmospheric moisture content changes. Points out the difficulty of obtaining reproducible results in tests of materials whose specimens have not been brought to some standard moisture content condition. Concludes that to procure these results the test condition should be a



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compromise of the following factors: reproducibility, economy, time required for the test, required accuracy, and a conditioning which will not change the material chemically or physically or in such a way as to make the test results those of a material not representative of the batch.

Conditioning of Insulating Materials for Test. Robert Burns, Bell Telephone Laboratories, Inc.

Points out the effects of humidity, temperature and light on the electrical and mechanical properties of insulating materials. Discusses the difficulty of obtaining reproducible test results without proper conditioning, and the natural limitations surrounding the choice of accelerated weather conditions. Outlines various methods of obtaining desired humidity and temperature, with particular reference to the so-called vapor pressure equilibrium system using sulfuric acid or salt solutions. Includes a brief discussion of artificial light sources, and an outline of conditioning cycles involving combinations of atmospheric phenomena.

Testing for Sludge Formation in Mineral Transformer Oil. F. M. Clark, General Electric Co., and E. A. Snyder, Socony-Vacuum Oil Co.

Discusses sludge testing for mineral transformer oils, interpolating a very large amount of data collected by Subcommittee IV on Insulating Mineral Oils of A.S.T.M. Committee D-9 on Electrical Insulating Materials in its cooperative and round-robin tests over the past three or four years, and gives an up-to-date picture of the present status of our knowledge of the subject of oxidation and sludging of oils.

Report of Committee D-2 on Petroleum Products and Lubricants. T. A. Boyd, Chairman.

Recommends for immediate adoption, revisions of the abridged volume correction table for petroleum oils, of the test for burning quality of kerosene oils, for carbon residue of petroleum products, and for steam emulsion of lubricating oils. Proposes a revision of the tentative method of test for knock characteristics of motor fuels. Recommends the adoption as standard of the tentative method of test for flash point by means of the tag closed tester, the test for viscosity of petroleum products and lubricants, and the test for gum content of gasoline. Submits for adoption as standard, the existing tentative revisions of the tests for distillation of crude petroleum, for flash point by means of Pensky-Martens closed tester, for saponification number and, after further revision, the test for gravity of petroleum and petroleum products by means of the hydrometer.

Presents as information two proposed methods of determining kinematic viscosity by two types of instruments (suspended-level and modified Ostwald). Includes statement on the development of color standards for the A.S.T.M. union colorimeter.

Report of Committee D-3 on Gaseous Fuels. A. C. Fieldner, Chairman.

First report of this committee outlining the details of its organization to undertake work on the sampling and testing of gases when such gases are used as commercial fuels. Presents outline of objectives and scope of work of its subcommittees on collection and on measurement of gaseous fuel samples on determinations of calorific value, of specific gravity and density, of impurities, and of water vapor content of gaseous fuels, also on complete analysis or chemical composition of gaseous fuels.

Report of Sectional Committee on Classification of Coals. A. C. Fieldner, Chairman.

Presents new tentative method for designating the size of coal from results of screen analysis tests of samples taken to represent the condition of the coal as sold. Proposes revisions of the tentative specifications for classification of coals by rank. Reports briefly on considerations being given to preparation of classification of coals according to type; also on studies being made on correlation of scientific classification with use classification of coals.

Report of Committee D-5 on Coal and Coke. A. C. Fieldner, Chairman.

Presents a tentative revision of the test procedure for determination of volatile matter in coal and coke. Reports the formation of new subcommittee on dustiness of coal and coke. Includes brief summaries of activities of subcommittees on methods of testing, nomenclature and definitions, pulverizing characteristics of coal, coal friability, and mechanical sampling and reduction of samples.

Tuesday, June 30 2 P.M. Third Session

Held Simultaneously with Second Session

Symposium on Radiography and X-ray Diffraction Methods

The Symposium on Radiography and X-ray Diffraction was developed by Subcommittee VI on X-ray Methods of A.S.T.M. Committee E-4 on Metallography. Preliminary sessions were held at the June, 1935, meeting in Detroit, at which many technologists in this field presented discussion and material which it is planned will be the basis of the formal symposium. The object of the symposium is to present summary accounts of the present status of X-ray methods in the testing of materials so that the practical usefulness of such methods may be evaluated. The following items elaborate this general statement:

(a) To describe modern methods and equipment in an elementary way in order to assist industries in the application of X-rays to their work.

(b) To present as many case histories of successful applications as possible.

(c) To compare the usefulness of X-ray methods with the usefulness of other methods which may be used alternatively.

(d) To include the application of radiographic and diffraction methods to both metallics and non-metallies.

In all, there are twelve papers—six covering radiography and six diffraction. Four Sessions of the meeting are devoted to these papers.

Radiography

Principles of the Radiographic Problem. J. T. Norton, Massachusetts Institute of Technology.

Presents a discussion of the elementary principles underlying the radiographic problem and the relation of various factors which enter into the production of a successful radiograph. The proper choice of these factors enables the operator to obtain a properly exposed radiograph and one in which the smallest possible defect in the object is revealed.

Foundry Applications of Radiography. Earnshaw Cook, The American Brake Shoe and Foundry Co.

Discusses specific application of radiographic testing to problems of the foundry. Comprises a distinctly practical discussion based largely on illustrative examples and designed to give an unbiased view of useful foundry applications of radiographic tests.

Application of Radiography to the Welding Art. J. C. Hodge, The Babcock & Wilcox Co.

Radiographic testing has had its greatest industrial developments, in this country at least, in the field of welding. Presents authoritative information as to the practical application of radiography in commercial welding, including some very large-scale operations.

(Continued in Fourth Session)

Tuesday, June 30 8 P.M. Fourth Session

Held Simultaneously with Fifth Session

Symposium on Radiography and X-ray Diffraction Methods (continued)

Radiography (continued)

Miscellaneous Applications of Radiography and Fluoroscopy. H. E. Seeman, Eastman Kodak Co.

While the more striking applications of radiographic testing have been in connection with cast and welded metals, there has been extensive use of the method in the examination of other materials and manufactured products. The paper describes applications of radiography and fluoroscopy in various fields and comments upon the efficacy of these methods. Some possible future uses are also discussed.

Gamma-Ray Radiography and Its Relation to X-ray Radiography. N. L. Mochel, Westinghouse Electric and Manufacturing Co.

Discusses generally the procedures involved in gamma ray testing, with the scope of such tests together with a critical discussion of limitations. Considers also the fields in which gamma ray may be employed profitably and in particular detail the relative fields for X-ray and gamma ray testing.

The Problems of Radiographic Specifications. H. H. Lester, Watertown Arsenal.

Radiographic tests are being used to greater and greater extent for the acceptance of castings and welds. Improperly applied this use may result in heavy and unnecessary losses to the manufacturer or may cause a false sense of security on the part of the consumer. This paper discusses pertinent features of the very real problem involved in radiographic specifications and correlates the results of a survey of current opinion in this particular field.

(See Seventh and Eighth Sessions for Diffraction Papers)

Tuesday, June 30 8 P.M. Fifth Session

Held Simultaneously with Fourth Session
Water

Report of Joint Research Committee on Boiler Feed Water Studies. C. H. Fellows, Chairman.

Contains brief résumé of committee's activities, including reports of the subcommittees on caustic embrittlement and on oxygen determination.

Report of Committee D-19 on Water for Industrial Uses. Max Hecht, Chairman.

Proposes for publication as information four methods of analysis of water for industrial uses, including procedures for the determination of sulfate ion, hydroxide ion, carbonate and bicarbonate ions and total carbon dioxide, and orthophosphate ions and total orthophosphate. Reports briefly on activities of subcommittees.

The Rate of Reaction of Sodium Sulfite with Oxygen Dissolved in Water. R. M. Hitchens and R. W. Towne, Monsanto Chemical Co.

The speed with which sodium sulfite combines with oxygen dissolved in water is a function of the temperature, of the concentration of sodium sulfite and of the concentration of catalysts and inhibitors in the water. In some waters it is rapid at ordinary temperatures and in all waters, even those with marked inhibitive properties, it is rapid at temperatures approaching the boiling point of water.

The Determination of Oxygen in Boiler Water. A. H. White, University of Michigan, D. W. Button and C. H. Leland.

Presents experimental results on the project intrusted to Subcommittee VIII on Investigation of Water Analysis Methods of the Joint Research Committee on Boiler Feed Water Studies. Discusses the errors involved in the Winkler analysis and the electrometric method of determining the end point in this reaction. Presents data showing the feasibility of boiling off the dissolved oxygen and collecting it in a receiver where it dissolves in the portion of distilled water which also comes over. This procedure eliminates the errors due to the presence of iron and non-volatile organic materials in the boiler water.

Effect of Solution Composition on the Failure of Boiler Steel Under Static Stress at 250 C. W. C. Schroeder, A. A. Berk and E. P. Partridge.

This report is largely concerned with the effect of the chemical constituents of the boiler water on the cracking of boiler steel. Compares the action of chemically pure sodium hydroxide and electrolytic hydrogen. Outlines some conditions under which sodium sulfate has a marked influence on the action of sodium silicate - sodium hydroxide solutions. Shows that oxidizing agents delay greatly the embrittlement of the steel in the experimental tests, and presents data for the possible reduction of sodium sulfite by hydrogen and iron.

Interpretations of Published Studies on the Cracking of Steel. D. S. McKinney, Duquesne Light Co.

The Use of Solubility Data to Control the Deposition of Sodium Sulfate or Its Complex Salts in Boiler Waters. W. C. Schroeder, A. A. Berk and E. P. Partridge.

The constituents normally present in a boiler water which are believed to exert the most influence on the cracking of boiler steel are sodium silicate, sodium hydroxide, and sodium sulfate. The first two are of primary importance in producing embrittlement and sodium sulfate tends to prevent embrittlement. Presents curves developed from extensive high-temperature solubility data, which express conditions under which sodium sulfate will be deposited during the evaporation of a boiler water of a given initial composition. With further experimental investigation these curves will accurately define the concentrations of sodium sulfate which can or should be maintained, whether the primary influence is produced by solid, or by dissolved sodium sulfate, or by the combined action of both solid and dissolved sodium sulfate.

Wednesday, July 1 9.30 A.M. Sixth Session

Held Simultaneously with Seventh Session

Corrosion, Effect of Temperature, Creep

Report of Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys. Jerome Strauss, Chairman.

Presents for publication as tentative, specifications for 20.0 per cent chromium, 9.0 per cent nickel alloy steel castings (18 and 8 type). Reports progress on assembling of data covering chemical, physical, mechanical and fabricating properties important in connection with the manufacture and application of alloys within the committee's jurisdiction; also considerations being given to methods of corrosion testing, and to metallographic testing of these alloys.

Report of Committee A-5 on Corrosion of Iron and Steel. F. F. Farnsworth, Chairman.

Presents new tentative method for the uniformity of coating by Preece test (copper sulfate dip) on zinc-coated (galvanized) iron or steel wire. Presents interesting summary of activities of subcommittees including latest results of inspections of the atmospheric tests at Annapolis and the total immersion tests. Includes data on inspections of galvanized sheets after 9 years' exposure. Reports progress of tests on metallic-coated hardware, structural shapes and tubular goods. Discusses the extensive research program on the outdoor corrosion of wire and wire products.

Report of Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys. T. S. Fuller, Chairman.

Brief progress report on activities of subcommittees on the salt spray test, atmospheric corrosion, corrosion in liquids, and on galvanic and electrolytic corrosion.

Report of Joint Committee on Exposure Tests of Plating on the Non-Ferrous Metals. William Blum, Chairman.

Describes general plan of exposure tests now under way at six test locations representing different types of atmospheric conditions. Presents detailed information on compositions of the base metals, which include steel, gray iron, malleable iron, copper, brass, nickel-brass, rolled zinc and zinc die castings. Includes detailed tabulation of schedule of the deposited coatings which comprise nickel, copper and chromium.

Report of Joint Research Committee of A.S.M.E. and A.S.T.M. on Effect of Temperature on the Properties of Metals. H. J. French, Chairman.

Reviews the work of the committee during the past year. Contains appendices giving details of the progress made in various researches.

Slow-Bend and Impact Tests of Notched Bars at Low Temperatures. H. F. Moore, H. B. Wishart and S. W. Lyon, University of Illinois.

Results are given of a series of slow-bend and impact tests of various metals at both room temperature and temperatures down to -40 F. The object of the study is to see whether the same degree



of correlation between slow-bend tests and impact tests of notched bars holds for low temperatures as has been shown to be the case by Petrenko for room temperatures. A special automatic-autographic slow-bend testing machine has been constructed for the tests, and the impact tests are made with an Izod impact testing machine.

Creep Test Machine. F. H. Morehead and J. J. Curran, Walworth Co.

Some Creep Tests on Lead and Lead Alloys. A. J. Phillips, American Smelting and Refining Co.

Presents in graphical form data obtained from long-time creep tests (up to 4 yr.) on certain pure leads and lead alloys. Demonstrates that creep strength on lead alloys cannot be connected in any way with the tensile strength, since most hard alloys of lead have lower creep strength than soft lead. The heat treatment of certain alloys has tremendous influence upon the creep, particularly under high loads.

Influence of Time at 1000 F. on the Characteristics of Carbon Steel. A. E. White, University of Michigan, C. L. Clark, University of Michigan, and R. L. Wilson, The Timken Steel and Tube Co.

Presents results from extended-time creep tests on annealed electric-furnace carbon steel at 1000 F. The stresses were so selected that rupture resulted at various periods during the tests and fractures have been obtained at time periods up to 14,000 hr. The results show the influence of time of test on the reported creep stresses and likewise that carbon steel becomes brittle after prolonged heating at 1000 F. Evidence is also presented showing (1) that the type fracture obtained, after sufficient time, is transcrystalline at temperatures below the lowest temperature of recrystallization (equicohesive temperature) and intercrystalline at temperatures above this range, and (2) that under stress, spheroidization will occur in this type steel at 1000 F. in time periods corresponding to certain of those used in the creep tests.

Wednesday, July 1 9.30 A.M. Seventh Session

Held Simultaneously with Sixth Session

Symposium on Radiography and X-ray Diffraction Methods (continued)

Diffraction

Equipment and Methods. C. S. Barrett, Carnegie Institute of Technology.

Describes the most useful kinds of apparatus for X-ray inspection of metallic and non-metallic materials, with illustrations of individual instruments and complete installations. Discusses the methods of value to the practicing engineer, giving recommendations as to proper usage, suitable instruments, sources of error, and probable accuracy.

Constitution of Alloys. K. R. Van Horn, Aluminum Company of America.

Discusses the application of X-rays to determine the constitution of alloys including normal types of examples in this field and also special applications. Points out with considerable care the usefulness of the X-ray methods in contrast to other methods.

Chemical Analysis. W. P. Davey, Pennsylvania State College.

Explains in elementary terms the exact procedure necessary to identify chemical compounds by X-rays. Gives numerous case histories where such X-ray identification of compounds and mixtures have been of commercial value and where other methods could not be used.

(Continued in Eighth Session)

Wednesday, July 1 2 P.M. Eighth Session

Symposium on Radiography and X-ray Diffraction Methods (continued)

Diffraction (continued)

Cold Work, Recrystallization, and Preferred Orientations. J. T. Norton, Massachusetts Institute of Technology.

It is in the metallurgical field that X-rays find their most unique application. This paper presents certain practical examples of successful applications covering the field of worked metals.

Particle Size Determinations. G. H. Cameron, Hamilton College, and A. L. Patterson, Massachusetts Institute of Technology.

Discusses the methods which may be used for determining particle size, particularly among non-metallic substances. Shows the testing engineer just how trustworthy X-ray methods are in this field and where they may be largely applied.

Non-Metallic Applications. G. L. Clark, University of Illinois.

Describes a number of applications to many unusual things such as opals, diamonds, flue dusts, violins, etc. Shows the range of X-ray application to a multitude of practical problems.

Wednesday, July 1 4 P.M. Ninth Session

Edgar Marburg Lecture

The purpose of the Edgar Marburg Lecture is to have described at the annual meetings of the Society, by leaders in their respective fields, outstanding developments in the promotion of knowledge of engineering materials. Established as a means of emphasizing the importance of promoting knowledge of materials, the Lecture honors and perpetuates the memory of Edgar Marburg, first secretary of the Society.

Eleventh Edgar Marburg Lecture: "Developing American Glass," by Dr. Arthur L. Day. (See page 3.)

American glass development was slower in starting than the corresponding European development in all its lines of activity, but since its beginnings has been more intensive and in many fields has proceeded farther, notably in the application of machinery to forming processes. Most of the glass-forming machinery in use in the world today is American-made. Historically, it is within the memory of men now living that the glassmaker's salesmanship consisted in convincing purchasers that his particular glass was better for all purposes than any other. Today, leading glassmakers offer several hundred compositions, each adapted to a particular purpose and often limited to that purpose, and the number of such purposes increases daily. Of almost equal importance is the recent development of physical tempering of glasses through which a given composition may be made to serve a wide variety of purposes with success.

It will be the purpose of the lecturer to follow through a number of these developments of recent years from their early beginnings, including not only the scope of application of modern glasses but also the tremendous mechanical development of processing machinery.

Award of Charles B. Dudley Medal to H. C. Mann.

The Tenth Award of the Charles B. Dudley Medal will be made to H. C. Mann, Research Engineer, Watertown Arsenal, for his paper on "The Relation Between the Tension Static and Dynamic Tests," presented before the Society at the 1935 annual meeting.

Wednesday, July 1 8 P.M. Tenth Session

Held Simultaneously with Eleventh Session

Spectrographic and Chemical Analysis

Report of Committee E-3 on Chemical Analysis of Metals. G. E. F. Lundell, Chairman.

Reports completion of analytical methods for the determination of carbon, manganese, phosphorus, sulfur, silicon, copper, nickel, chromium, vanadium, molybdenum, titanium and tungsten in steel and iron to replace the present standard methods of chemical analysis of plain carbon steel, alloy steels, pig and cast iron, and methods of sampling rolled and forged steel products for check analysis. Reports preparation of draft of analytical methods for the determination of nickel and silicon in brass ingots and sand castings and that consideration is being given to procedures for the determination of lead, tin, and iron in these alloys. A method for determination of aluminum in iron-chromium-aluminum alloy is being developed.

Report of Committee E-2 on Spectrographic Analysis. H. V. Churchill, Chairman.

Brief progress report discussing activities of the committee.



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The Spectrographic Determination of Small Quantities of Arsenic in Lead, Copper and Their Alloys. Frances W. Lamb, Bohn Aluminum and Brass Corp.

Discusses the need for a method which permits a comparatively rapid and reliable determination of small quantities of arsenic in metals having small percentages of arsenic present as an impurity, and as a control method for alloys to which small amounts of arsenic are added. Presents problems met with on developing a satisfactory spectrographic method. Describes the procedure and apparatus including the use of special ultra violet sensitive plates in order to increase the sensitivity of the arsenic line at wave length 2349.84 Å., and results illustrated by 2 or 3 spectograms and a working curve. Discusses the advantages of this method in comparison with present chemical procedures.

Spectrochemical Analysis of Nickel Alloys for Various Additions or Impurities. C. J. Neuhaus, The International Nickel Co., Inc.

Describes present equipment, its limitations and how these were, at least partly, overcome by developing special methods for various elements. Discusses such methods for the elements lithium, boron, magnesium, aluminum, calcium, titanium, zirconium and lead, special consideration being given to the selection of spectrum lines, mode of excitation and electrode types. Discusses accuracy and precision. Points out enlarged scope it is hoped to attain with new apparatus.

The Spectrographic Determination of Magnesium in Aluminum Alloys. W. R. Koch, U. S. Army Air Corps, Wright Field.

Compares photometrically, the spectra of a series of aluminum-magnesium alloys with those of similar alloys containing appreciable amounts of either copper, iron, manganese or silicon. Compares the results obtained from arc and spark spectra. Includes aluminum alloys containing magnesium in concentrations from 0.01 to 5.0 per cent.

Developments in the Quantitative Analysis of Solutions by Spectrographic Means. O. S. Duffendack and K. B. Thomson, University of Michigan.

Discusses the several spectrographic sources which have been developed for use in quantitative analysis of solutions, including a source in which both electrodes consist of the solution itself where the solution is made to issue slowly from jets of glass or quartz mounted opposite each other in a horizontal position and these jets are the electrodes of a highly inductive spark; several sources which require only a drop of the solution to be analyzed, one of which consists of a high voltage alternating current arc between electrodes of carbon or metal upon which a drop of the solution has been evaporated; and another source consisting of a hollow cathode discharge in helium in which a drop of solution is evaporated on the inside of the hollow cathode.

Wednesday, July 1 8 P.M. Eleventh Session
Held Simultaneously with Tenth Session
Testing, Fatigue of Metals

Report of Committee E-1 on Methods of Testing. W. H. Fulweiler, Chairman.

Presents new tentative test for softening point by ring-and-ball method which is applicable to asphalts, tars, pitches, rosins and most resins, both natural and synthetic. Also presents proposed method of measurement of average particle diameter of sub-sieve particulate substances by dark field methods. Submits for publication as information, recommendations on how speed of testing should be measured; also proposed recommendations on interpretation and designation of numerical requirements in standards.

Recommends adoption as standard of tentative method of analysis for the particle size distribution of sub-sieve size particulate substances, the tentative methods of verification of testing machines, methods of Rockwell hardness testing of metallic materials, and the definitions of the terms "elastic limit," "proportional limit," "yield strength" and "yield point." Proposes for immediate adoption revisions of the standard methods of tension testing of metallic materials.

Report of Sectional Committee on Specifications for Sieves for Testing Purposes. L. T. Work, Chairman.

Applications of the Wedge Extensometer. W. M. Wilson, University of Illinois.

Describes an extensometer that utilizes the taper of a wedge as a multiplying device in measuring changes in distance between two points with a high degree of accuracy. The instrument is reliable and sensitive, having a tolerance of 0.00002 in. It is limited in its field of application but fortunately can be used in situations to which the usual extensometers are not adaptable. Also describes several successful adaptations of the instrument to special problems that have been made by the author.

High Velocity Tension Impact Tests. H. C. Mann, Watertown Arsenal.

Presents data obtained from ferrous and nonferrous materials tested in tension impact at velocities up to 300 ft. per sec., and is a continuation of the work referred to in the paper presented at the 1935 annual meeting by the author. The results show that each material and material condition behaves in a normal manner up to a certain limiting velocity, above which there is a transition in energy values, deformation, form of slip, and microstructure. Describes the high velocity impact machine designed and built for the purpose, and presents diagrams of the data obtained, and photos of the typical fracture and micro transitions.

Report of Committee D-15 on Thermometers and Laboratory Glassware. W. H. Fulweiler, Chairman.

Report of Research Committee on Fatigue of Metals. H. F. Moore, Chairman.

Reports on cooperative work with Committee E-4 on Metallography and on noteworthy developments of the year in the field of fatigue testing.

Damage and Overstress in the Fatigue of Ferrous Materials. H. W. Russell and W. A. Welcker, Jr., Battelle Memorial Institute.

Gives results of fatigue studies made on twelve ferrous materials covering a wide range of structure and properties, in which the damage produced by overstressing for a number of cycles insufficient to cause fracture was investigated with both the conventional polished specimens and specimens with a square notch. Discusses the correlation between the high-stress fatigue properties and the results of tension and impact tests.

Thursday, July 2 9.30 A.M. Twelfth Session

Held Simultaneously with Thirteenth Session

Iron and Steel

Report of Committee A-3 on Cast Iron. Hyman Bornstein, Chairman.

Presents new, tentative specifications for light gray-iron castings. Recommends adoption as standard of the tentative specifications for gray-iron castings, with minor editorial changes. Proposes withdrawal of standard specifications for chilled cast-iron wheels which have been replaced by tentative specifications. Discusses activities of sub-committees.

Report of Committee A-2 on Wrought Iron. H. W. Faus, Chairman.

Presents new tentative specifications for refined wrought iron bars and a revision of the existing standard specifications. Submits a revision of the standard specifications for staybolt, engine bolt and extra refined wrought iron bars. Recommends the adoption as standard of the tentative specifications for uncoated and zinc coated (galvanized) wrought iron sheets. Submits for adoption the existing tentative revisions of the standard specifications for wrought iron blooms and forgings, for lap-welded seamless steel and lap-welded iron boiler tubes, for staybolt, engine-bolt and extra-refined wrought iron bars, for common iron bars and for hollow rolled staybolt iron.

Report of Committee A-6 on Magnetic Properties. Thomas Spooner, Chairman.

Recommends for adoption as standard the tentative definitions of terms, with units and symbols, relating to magnetic testing. Recommends adoption of the existing tentative revisions in the standard



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methods of test for magnetic properties of iron and steel, and proposes new revisions in these methods. Reports on activities of subcommittees on alternating current tests at low induction, on tests of high magnetizing forces and on core loss tests of electrical sheet at high inductions.

Report of Sectional Committee on Standardization of Dimensions and Material of Wrought-Iron and Wrought-Steel Pipe and Tubing. H. H. Morgan, Chairman.

Report of Committee A-1 on Steel. H. H. Morgan, Chairman.

Presents new tentative specifications for fabricated bar or rod mats and welded wire fabric for concrete reinforcement; for one- and two-wear solid wrought carbon-steel wheels; and for seamless cold-drawn alloy steel (4-6 per cent chromium) heat-exchanger tubes and still tubes. Recommends revisions of existing specifications in the form of new tentative specifications for high-carbon and quenched-high-carbon joint bars and structural nickel steel. Proposes adoption as standard of tentative specifications for axle steel reinforcement bars; alloy-steel castings (structural); carbon-steel castings (railroad); pipe for ordinary uses, and electric-fusion-welded pipe; plates for boilers; high tensile strength plates; and four specifications for materials for high-temperature service which cover respectively, lap-welded and seamless and electric-fusion-welded pipe, alloy-steel castings, seamless pipe and forgings. Recommends extensive revisions in several steel specifications.

Failure of Suspension Bridge Cable Wire. W. H. Swanger and G. F. Wohlgemuth, National Bureau of Standards.

For several years studies have been under way at the National Bureau of Standards on the failures of the cable wire of the Mount Hope suspension bridge which necessitated dismantling the partly built bridge. The original wire brought to a high strength by quenching and tempering was replaced successfully by cold-drawn wire of about the same size, carbon content and strength. This paper details the extensive test and research work and gives the data which resulted in the solution of this vexing problem, at the same time explaining why the cold-drawn wire is satisfactory. Extended hardness, tension and bend tests on wire from the cable checked with original tests and microstudies showed no defective material or faulty heat treatment. Internal fissures were ruled out and thermomagnetic and related studies indicated no change in structure after treatment. Failure was related to stress conditions at the anchorage and the solution of the problem given in detail in the paper indicates that stress conditions in the heat-treated wire were different from those for the cold-drawn and that the latter was also better able to resist the stresses causing failure.

High Speed Impact Tests on Bolt Steel. D. S. Clark and G. Dätwyler, California Institute of Technology.

Describes a high-speed tension impact machine built by the authors which has been employed in testing a bolt steel of the following analysis: 0.16 per cent carbon, 0.013 per cent phosphorus, 0.22 per cent silicon, 0.62 per cent manganese, 0.043 per cent sulfur. Presents results for this material tested at velocities up to 250 ft. per sec. The method of comparison of static and dynamic tests presented by H. C. Mann, at the 1935 annual meeting of the Society, has been applied in this investigation. The results indicate that the impact value for this material is constant up to the above mentioned rate of deformation.

Report of Joint Committee on Investigation of the Effect of Phosphorus and Sulfur in Steel. H. S. Rawdon, Chairman.

Final report on effect of sulfur in steel.

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Thursday, July 2 9.30 A.M. Thirteenth Session

Held Simultaneously with Twelfth Session
Cement, Lime, Aggregates

Report of Committee C-1 on Cement. P. H. Bates, Chairman.

Presents new tentative specifications for high-early-strength treated portland cement and recommends revision and adoption as standard of the tentative specifications for high-early-strength portland cement. Reports on work of cement reference laboratory and includes extensive report of working committee on volume change and soundness which

contains results of tests on 34 high-early-strength cements. Presents as information chemical procedures for determining manganese and phosphorus in cement. Contains résumé of considerations being given to definition of portland cement, to work on masonry, blended, natural and low-heat-of-hydration cements; and to tests for fineness, and time of setting, and plastic mortar tests.

Effect of Planeness of Bearing Surfaces on Compressive Strength of Two-Inch Mortar Cubes. J. R. Dwyer, National Bureau of Standards.

A Hydrometer Method for Determining the Fineness of Portland-Puzzolan Cements. S. B. Biddle Jr., and Alexander Klein, University of California.

Discusses a hydrometer method of analysis which has been adapted from that commonly used in soil analysis to supplement the common methods of mechanical analysis of portland cement and to assist in extending the use of such methods into the field of portland-puzzolan cement. Reviews the theoretical considerations in particle-size determination by hydrometer, describes the procedure of testing and calculating, and compares typical results with those obtained by independent methods.

The Influence of Low Curing Temperatures on the Hardening of Cement Mortars. Engineer Mironoff, Central Institute for Industrial Building Research, Moscow, U.S.S.R.

Presents data showing that mortars and concretes subjected to low temperatures for 36 hr. or more after placing, and then to normal curing, develop higher ultimate strengths than those cured entirely under normal conditions. In attempting to explain these phenomena, the author offers a theory of gel formation and hardening which merits further investigation.

Petrographic Studies of Hydrated Cements. R. W. Carlson, University of California, and L. S. Brown, Lone Star Cement Co.

Details an improved technique for preparing, for petrographic study, thin sections of hydrated cement. Presents photomicrographs of numerous sections as they appear when ordinary light is passed through them (showing unhydrated grains in contrast with hydrated material) and as they appear when polarized light is passed through them and they are viewed through a cross-polarizing prism (showing crystalline material and amorphous material in contrast). Included are: (1) ordinary cements in different finenesses and water-cement ratios, (2) steam-cured cements, (3) cements with puzzolanic admixtures, (4) pure silicates of cement, and (5) cements of uniform particle size.

Report of Committee C-7 on Lime. James R. Withrow, Chairman.

Presents new tentative specifications covering hydraulic hydrated lime for structural purposes and sand for use in plaster, the latter prepared in cooperation with Committee C-11 on Gypsum. Recommends that autoclave soundness test in the tentative methods of physical test for limestone, quicklime and hydrated lime be replaced by the constancy of volume test. Reports that proposed specifications for prepared lime plaster are in preparation.

The Cone Method for Determining Absorption by Sand. D. O. Woolf, U. S. Bureau of Public Roads.

Discusses the methods which have been used for determining the absorption by sand and indicates the difficulties and errors inherent in these methods. Outlines briefly the development of the cone method and describes the method in detail. Presents the results of a cooperative series of tests, performed by twelve laboratories, in which the cone method is compared with three other absorption methods. Concludes from this series of tests that the cone method is superior to the other methods used and that the cone method furnishes a reliable and accurate result with a minimum of equipment and working time.

Elastic and Thermal Properties of Concrete as Related to Similar Properties of the Aggregate. L. H. Koenitzer, Kansas State College of Agriculture and Applied Science.

Presents data and discussion of a detailed study on the relationship that exists between stone specimens and concrete specimens containing the same stone. This study should throw new light on much of the literature published heretofore on volume change, elastic properties,



and durability studies. It gives data on linear change due to heating (70 to 166 F.); linear change due to cooling (freezing), and effect of moisture on linear change of stone and concrete specimens. Also, it gives the modulus of elasticity of stone and concrete specimens under similar conditions.

Thursday, July 2 Afternoon Open
Committee Meetings and Recreation
Golf Tournament

Thursday, July 2 8 P.M. Fourteenth Session
Held Simultaneously with Fifteenth Session
Concrete, Road and Paving Materials, Soils

Report of Committee C-9 on Concrete and Concrete Aggregates. R. W. Crum, Chairman.

Presents as tentative new specifications for coal and lignite in sand; a laboratory method of making flexure tests of concrete using a simple beam with third point loading; and a method of test for flow of portland-cement concrete. Proposes a revision of the tentative specifications for concrete aggregates. Recommends adoption as standard of the tentative method of test for determination of voids in coarse aggregates, test for structural strength of fine aggregate, laboratory test for absorption by aggregates for concrete, field test for absorption of mixing water by aggregates for concrete, method of making compression tests of concrete, using portions of beams broken in flexure and specifications for sodium silicate for curing concrete. Proposes adoption of the existing tentative revisions in the standard method of test for sieve analysis of aggregates for concrete and submits changes in three standard specifications for curing portland-cement concrete slabs.

Includes a report of studies on relation between characteristics of blast furnace slag and other coarse aggregates and properties of resultant concretes and a report on durable concrete.

Papers appended:

"Concrete Permeability Tests," by E. N. Vidal and G. A. Samson, Bureau of Reclamation.

"Shrinkage of Haydite and Sand-Gravel Concrete," by F. E. Richart and J. E. Keranen, University of Illinois.

Report of Joint Committee on Concrete and Reinforced Concrete. A. E. Lindau, Chairman.

An informal report of progress on the various activities of the committee.

Rating Characteristics of Fresh Concrete. H. E. Davis and J. W. Kelly, University of California.

As an aid to uniformity in the judgment of the quality of fresh concrete, this paper defines and classifies the various factors involved (consistency, plasticity, cohesiveness, apparent composition, tendency toward segregation, stiffening, placeability, and defects), and presents a tabular form for their rating. Discusses the possibilities of applying a numerical rating scale.

Effect of Testing Speed on Strength and Elastic Properties of Concrete. P. G. Jones and F. E. Richart, University of Illinois.

Presents data on the effect of speed of testing upon compressive strength and the effect of speed upon stress-strain relations in the concrete. The tests were made upon standard 6 by 12-in. cylinders of nominal strengths of 2000, 3500 and 5000 lb. per sq. in., the testing having been done in a screw power testing machine with about 8 or 10 speeds provided by use of a variable speed d.c. motor. Loads and average strains were read and recorded by means of telemeter gages and pressure block connected to an oscillograph. Time was also indicated on the oscillograph record by means of a 60-cycle timing wave for fast speeds and a chronograph interrupter for slower speeds.

Report of Committee C-13 on Concrete Pipe. M. W. Loving, Secretary.

Report of Committee D-4 on Road and Paving Materials. M. H. Ulman, Chairman.

Recommends for adoption as standard the tentative method of test for residue of specified penetration and the tentative method of test for separation of liquid asphaltic products. Also recommends adoption of group o and group t of abridged volume correction table for petroleum oils as the standard volume correction table for asphaltic products. Proposes withdrawal of the standard method of test for softening point of bituminous materials (ring-and-ball method), a revision of which in the form of a new tentative method has been prepared in cooperation with Committee E-1 on Methods of Testing.

Internal Stability of Granular Materials. W. S. Housel, Michigan State Highway Dept.

Discusses existing theories of internal stability as based on the conventional conceptions of internal friction, including a discussion of a number of inconsistencies which arise in the use of internal friction. Develops a theory of internal stability based entirely on the equilibrium of elementary soil arches, and treats three major problems, (1) pressure distribution under concentrated loads on the surface of a granular mass, (2) the relation between the principal pressures, vertical and lateral, in a granular mass due to its own weight, and (3) the bearing capacity of a granular mass with a description of failure due primarily to lateral displacement.

Testing and Design of Stabilized Soil Mixtures. C. A. Hogentogler, Jr., George Washington University.

Presents a brief résumé of the theory of soil stabilization; role of electro-chemical phenomena; theory and technique of the Proctor field tests and laboratory adaptation; effect of admixtures; and design of soil mixtures by means of stability tests.

Sampling and Testing of Foundation Soils. L. A. Palmer and Henry Aaron, U. S. Bureau of Public Roads.

Discusses methods used in obtaining undisturbed core samples; mechanics of soil consolidation; the pressure bulb; theory and technique of the compression, swell and permeability tests; and typical examples of the application of compression test data in foundation design.

Determination of the Approximate Percentage of Moisture in Soil Samples Without Drying. E. E. Bauer, University of Illinois.

Discusses the work done by the author to adapt the procedure developed by Prof. W. M. Dunagan for the determination of the constituents of freshly made concrete, to the determination of the moisture content of soils. Explains briefly the theory involved, describes the equipment and the test procedure used by the author, and gives results of tests made, including oven-dried check-test results.

Thursday, July 2 8 P.M. Fifteenth Session

Held Simultaneously with Fourteenth Session

Rubber and Textiles

Report of Committee D-13 on Textile Materials. H. J. Ball, Chairman.

Presents new tentative specifications and methods of test for certain carded cotton gray goods; also methods of test for resistance to yarn slippage in silk, rayon, and silk-rayon woven broad goods; and tests for fastness of dyed or printed cotton, silk or rayon fabrics to laundering or domestic washing. Submits revisions of methods of testing and tolerances for silk and cotton tapes, test for small amounts of copper and manganese in textiles, and for pile floor covering. Recommends for adoption revisions of the standard general methods of testing woven textile fabrics, the methods of testing and tolerances for cotton yarns and for cotton sewing threads and the specifications and test methods for asbestos tape; also a revision of the standard methods of testing and tolerances for certain light and medium weight cotton fabrics for publication as tentative.

Recommends the adoption as standard of the tentative method of estimating hard scoured wool in wool in the grease, methods of testing and tolerances for tubular sleeving and braids, and for woolen and worsted yarns; also the adoption of the tentative specifications for textile testing machines, specifications and test methods for asbestos yarns and for asbestos roving.



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Announces the organization of a new subcommittee on household and garment fabrics and reorganization and enlargement of work on bast fibers and their products. Discusses briefly work of subcommittees on cotton, rayon, wool, felt, asbestos, silk, and their respective products.

Report of Committee D-11 on Rubber Products. H. A. Depew, Chairman.

Submits tentative revisions of the standard methods of chemical analysis of rubber products. Proposes revisions in the tentative specifications and tests for friction tape, in the test for compression set of vulcanized rubber, methods of tension testing, test for adhesion, and for accelerated aging of vulcanized rubber, and test for adhesion of vulcanized rubber to metal. Recommends adoption as standard of the tentative methods of testing rubber belting and of the methods of test for rubber hose. Reports progress in the program for development of certified standard samples. Discusses activities of various subcommittees, including the reorganization of the subcommittee on insulated wire and cable and the work of the subcommittee on life tests which has in preparation a proposed method for air bomb tests for publication as information.

Symposium on the Limitations of Laboratory and Service Tests in Evaluating Rubber Products

One of the significant factors in the great improvement in the quality of rubber products during the past decade has been the development of improved testing methods. A number of these methods have been standardized by the Society's Committee D-11 on Rubber Products and published by the Society.

These tests have been used by consumers in purchase specifications as well as for research and control of manufacturing. There can be little doubt but that in some cases they have been used unwisely in specifications.

The series of papers comprising this symposium deals with five important classes of rubber products and shows the relative importance of: (1) Laboratory tests in which pieces of the products are tested, (2) Laboratory performance tests in which the product is tested as a whole, (3) Service tests, and (4) The good name and reputation of the manufacturer.

It is hoped that these papers will give the consumer a better idea of the relative value of the different kinds of tests and at the same time show him their limitations. The discussion and comments of all interested will be an important part of the following papers in this symposium:

Methods of Evaluating Tire Performance. R. D. Evans, The Goodyear Tire and Rubber Co.

The Testing of Rubber Footwear. W. E. Glancy, Hood Rubber Co., Inc.

Significance of Laboratory Tests in Evaluating Automotive Rubber Parts. J. J. Allen, The Firestone Tire and Rubber Co.

The Relation Between Laboratory Tests and Service Life of Rubber Hose and Belting. W. L. Smith and Arthur W. Carpenter, The B. F. Goodrich Co.

Testing of Rubber Insulated Wires and Cables. Dean Harvey, Westinghouse Electric and Manufacturing Co.

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Friday, July 3 9.30 A.M. Sixteenth Session

Held Simultaneously with Seventeenth Session
Bituminous Materials

Report of Committee D-8 on Bituminous Waterproofing and Roofing Materials. J. M. Weiss, Chairman.

Recommends adoption of group 0 and group 1 of abridged volume correction table for petroleum oils as the standard volume correction table for asphaltic products. Presents two proposed methods of test

for sieve analysis of granular and of non-granular mineral surfacing for asphalt roofing and shingles. Contains brief résumé of activities of subcommittees on specifications for membrane materials, on specifications for bituminous coatings for cold application, and on tests for mineral surfacing materials.

Paper appended:

"A Comparison of Abrasion Test Methods for Embedding of Granular Mineral Surfacing on Asphalt Roofing," by H. W. Greider and G. A. Fasold, The Philip Carey Manufacturing Co.

The Effect of Mineral Fillers on the Serviceability of Coating Asphalts. O. G. Strieter, Research Associate at the National Bureau of Standards for the Asphalt Shingle and Roofing Institute.

Describes the effects of a variety of mineral fillers on the physical properties of coating asphalt and compares the durabilities of a variety of asphalt-filler mixtures both in their outdoor and accelerated exposures. The tests show that in general, addition of fillers improves the durability of coating asphalts and the data demonstrate the similarity between outdoor and accelerated exposures.

A Further Study of the Heterogeneity of Asphalt—A Quantitative Method. G. L. Oliensis, The Barber Asphalt Co.

Contains a further discussion of the significance of the spot test, which test was first described by the author in a paper presented before the Society in 1933. Several additional causes of heterogeneity are explained, other than high temperatures. A method of determining heterogeneity quantitatively is presented, the procedure being exactly as in the qualitative determination, except that instead of straight naphtha, mixtures of naphtha and xylene are used, the minimum proportion of xylene necessary to yield a negative "spot" determining the degree of heterogeneity quantitatively.

Measurement of High Viscosity—a Rapid Method. R. N. Traxler and H. E. Schweyer, The Barber Asphalt Co.

Discusses the flow properties of highly viscous substances such as bitumen and presents diagrammatic illustrations, directions for operating and formulas used for calculating viscosities, in absolute units, for the following instruments: (1) the capillary tube type of viscometer modified to measure viscosities from ten to one million poises; (2) the alternating stress type viscometer, which can measure viscosities from one million to one hundred million poises; (3) the rotating concentric cylinder viscometer, adaptable to a very wide range; and (4) the falling coaxial cylinder type, which can also be used over a wide range.

Describes a falling coaxial cylinder type viscometer selected from twenty-five different sizes as the most satisfactory instrument for rapidly measuring viscosities above 5000 poises. This instrument is adapted so that it can be used as a laboratory control viscometer.

The Susceptibility of Asphalts to Temperature Change. H. E. Schweyer, C. E. Coombs and R. N. Traxler, The Barber Asphalt Co.

The change of consistency with change of temperature is a very important property of asphalts. Proposes a new and simple way of expressing susceptibility based on the percentage change of viscosity for a one-degree rise in temperature which is called the asphalt viscosity index. Presents viscosity data in absolute units for a number of different paving asphalts both at the high "processing" and the low "service" temperatures.

Increase in Viscosity of Asphalts with Time. R. N. Traxler and H. E. Schweyer, The Barber Asphalt Co.

When asphaltic bitumens are maintained undisturbed at 25°C. the viscosities were found to increase with time. This paper presents results of an investigation of this aging phenomenon using the falling coaxial cylinder viscometer on a number of asphalts of various origins and methods of processing. Eight to eleven viscometers were loaded with asphalt and placed in a cabinet maintained at 25°C. As soon as the samples had cooled to this temperature (3 to 4 hr.) one was removed and the viscosity determined. The remaining samples were removed at increasing intervals of time and the viscosities determined at 25°C.



Compression Testing of Asphalt Paving Mixtures. Roland Vokac, The Barber Asphalt Co.

Establishes the basis for standardizing a compression test for asphaltic mixtures which will enable the engineer to specify or design paving mixtures on the basis of modulus of elasticity, yield value, and compressive strength as he would in the case of steel or portland-cement construction. Discusses the effect of size and ratio of height to diameter of cylindrical specimens and the effect of temperature and rate of loading or deformation.

Friday, July 3 9.30 A.M. Seventeenth Session

Held Simultaneously with Sixteenth Session

Non-Ferrous Metals, Metallography

Report of Committee B-1 on Copper and Copper Alloy Wires for Electrical Conductors. J. A. Capp, Chairman.

Presents new tentative specifications for hard drawn copper alloy wires. Recommends adoption as standard of tentative specifications for bronze trolley wire to replace the existing standard and adoption of tentative revision in standard specifications for copper trolley wire.

Torsion and Flexure Testing of Copper Wire. S. E. Borgeson, General Research Laboratories, General Cable Corp.

Analyzes various types of bend tests for copper magnet wire and shows that the mechanical properties they measure in terms of arbitrary scale units may be measured in conventional units by the use of torsion tests. Discusses the relation between the mechanical properties of wire as measured in flexure and in torsion and presents results of tests using both methods. Describes a simple type of direct-reading torsion tester.

Effect of Time on Tensile Properties of Hard-Drawn Copper Wire. A. J. Phillips and A. A. Smith, Jr., American Smelting and Refining Co.

Data are given showing that the determination of tensile properties of hard-drawn copper wire depends to a considerable extent upon the time factor. This phenomenon has tremendous significance in determination of elastic limit. Shows that wire that has been pre-loaded for several days possesses much better elastic properties than the original hard-drawn copper wire. In fact, pre-loaded wire, with rapid testing, has almost perfect elasticity with an extremely small hysteresis loop.

Report of Committee B-5 on Copper and Copper Alloys, Cast and Wrought. C. H. Mathewson, Chairman.

Presents new tentative specifications for seamless copper-nickel alloy condenser tubes and ferrule stock, for sheet and strip phosphor bronze, for bronze castings in the rough for wearing parts, and for car and tender lined journal bearings. Submits new tentative specifications for bronze castings for turntables and movable bridges as a revision of the existing standard specifications. Recommends revisions of specifications for manganese-bronze ingots for sand castings; for manganese-bronze sand castings. Recommends adoption of revisions of specifications for aluminum-bronze castings; for sand castings of the alloy: copper 88 per cent, tin 8 per cent, zinc 4 per cent; for steam or valve bronze sand castings, and for composition brass or ounce metal sand castings. Presents revisions of tentative specifications for copper-silicon alloy plates and sheets, for sheet copper-silicon alloy and for copper silicon alloy wire for general purposes. Recommends adoption as standard of the tentative specifications for copper-base alloys in ingot form for sand castings.

Report of Committee B-4 on Electrical-Heating, Electrical-Resistance and Electric-Furnace Alloys. Dean Harvey, Chairman.

Presents new tentative method of test for the flexure-temperature characteristics of thermoflex (thermostatic metals) in the form of flat strips. Recommends for adoption revisions in the standard method of test for resistivity of metallic materials, accelerated life test for metallic materials for electrical heating, and test for the temperature-resistance constants of resistance alloy wires; and editorial changes in the standard method of test for thermoelectric power of electrical-resistance alloys. Submits as information proposed methods of bend test for wire comprising three types of apparatus and procedures.

Includes brief statements of activities of subcommittees on life tests, electrical tests, mechanical tests, wrought and cast alloys for high-temperature use, and on thermostatic metals.

Bend Testing of Wire for Vacuum Tubes. D. A. S. Hale and W. J. Farmer, Bell Telephone Laboratories, Inc.

Discusses a test for determining the ability of a wire to resist deformation by impact bending and the development of a pendulum-type machine of sufficient sensitivity to detect small differences in bending resistance. Presents a résumé of a number of different methods of measuring stiffness together with comments on the suitability for giving the type of information needed in design problems.

Report of Committee E-4 on Metallography. C. H. Davis, Chairman.

Submits revisions of the standard rules governing the preparation of micrographs of metals and alloys, and of the standard grain size chart for classification of steels. Recommends the adoption as standard of the tentative recommended practice for metallographic testing of ferrous and non-ferrous metals to replace the present standard methods.

(**Non-Ferrous Metals Continued in Eighteenth Session**)

Friday, July 3 2 P.M. Eighteenth Session

Held Simultaneously with Nineteenth Session

Non-Ferrous Metals (continued)

Report of Committee B-7 on Light Metals and Alloys, Cast and Wrought. Sam Tour, Chairman.

Submits new tentative specifications for magnesium-base alloy bars, rods and shapes. Reports on a thorough study and review of all the tentative specifications under its jurisdiction, including recommended changes in specifications covering aluminum-base sand casting alloys in ingot form and sand castings; aluminum sheet and plate; duralumin sheet and plate, bars, rods and shapes; aluminum-manganese alloy sheet and plate; magnesium-base alloy sand castings, sheet, forgings, alloy ingot and stick for remelting.

Report of Committee B-6 on Die-Cast Metals and Alloys. J. R. Townsend, Chairman.

Proposes revision of the tentative specifications for aluminum-base alloy die castings, involving the dropping of alloy No. VI, modification of the composition of alloy No. XII and changes in the tables of properties. Reports completion of accelerated corrosion studies after one-year exposure to the salt spray test of aluminum alloys Nos. IV, V and Va, and also physical test results. Reports considerations being given to conduct of tests to determine strength, hardness and aging properties of the lead and tin-base alloy die castings.

Paper appended:

"Finishing Properties of Die Casting," by J. C. Fox, Doehler Die Casting Co.

Report of Committee B-2 on Non-Ferrous Metals and Alloys. R. F. Mehl, Chairman.

The Effect of the Addition of Lead on the Endurance Limit of a Certain Tin-Base Bearing Alloy. J. N. Kenyon, Columbia University.

Discusses the effect of the addition of lead on certain tin-base bearing alloys and presents results of endurance tests on a Babbitt metal (80 per cent tin, 15 per cent antimony, 5 per cent copper) prepared from commercially pure materials, and a second alloy with these elements plus 4 per cent of lead. The two alloys were chill cast into $\frac{1}{2}$ by 5-in. rods, annealed for 12 hr. at 100 C. and turned up into standard R. R. Moore fatigue coupons.

Ductility Testing of Aluminum and Aluminum Alloy Sheet. R. L. Templin, Aluminum Company of America.

Because of the great diversion of opinions as to what constitutes ductility of a metal and as to just what measures this same quantity, it seemed advisable to review a number of existing tests purported



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to give a measure of this property. This paper makes brief reference to the known effects of the size and shape of test specimen and gage length on the ductility measurements obtained from the tension tests. Compares results of bending tests, Erichsen tests, and tension tests, and shows that there is no reliable correlation between them. Discusses results of the Sach's ductility tests with a view to pointing out the difficulties involved in arriving at indices of ductility from this method.

Effect of Iron Impurities on the Annealing of High Brass.
W. A. Gibson and J. H. Doss, Revere Copper and Brass, Inc.

Discusses the effect of iron impurities in the annealing of high brass for temperatures from 600 to 1200 F. and for iron impurities from 0.008 to 0.287 per cent. Pays particular attention to the effect of annealing at temperatures from 800 to 900 F. and for iron impurities below 0.10 per cent. There is also indicated the effect of time on the annealing of brass. The detailed attention given the lower iron contents and the lower annealing temperatures differs in this paper from previously published information and brings out information not noticeable with less detailed data.

Forming Properties of Some Non-Ferrous Sheet Metals.
G. R. Gohn, Bell Telephone Laboratories, Inc.

Discusses an investigation of the forming properties of non-ferrous sheet metals. Describes a method of test whereby strips of metal $\frac{1}{4}$ by 3 in. are bent to determine the minimum safe radius for forming a 90-deg. bend. The test consists of forming a series of such specimens with forming tools having various radii from sharp to 1 in. inclusive. The sheet metal specimens are formed with these tools in a punch press operating at the service rate of 120 r.p.m. Three grain directions were studied with respect to the long dimension of the specimen, namely, parallel, transverse and 45 deg. Standard tempers and gages were tested. Presents data for a large number of non-ferrous metals—brasses, bronzes, aluminum alloys, etc.

Stress-Relief Annealing High-Strength Monel Metal Plate.
P. R. Kosting, Watertown Arsenal.

Presents results of tests made to determine the effect of temperature of annealing and time at temperature upon the physical properties of high-strength monel metal, $\frac{1}{2}$ in. thick. Plates from four heats were studied. All plates were hot-rolled but finished at low temperature, except some of the plates from one heat, which were cold-rolled 10 per cent. Extensometers of 0.0002 and 0.00002-in. sensitivity were used for determining "yield strength, 0.00 per cent set" (proportional limit).

Miscellaneous Business.

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Friday, July 3 2 P.M. Nineteenth Session
Held Simultaneously with Eighteenth Session
Ceramics, Building Materials, Paint

Report of Committee C-3 on Brick. H. T. Shelley, Chairman.

Brief progress report stating that subcommittees on clay building brick and on methods of testing are considering revisions in the specifications and tests under their jurisdiction. Announces organization of new subcommittee on glazed and enameled brick.

Paper appended:

"The Determination of the Ratio of Cold Water Absorption to the Boiling Water Absorption," by J. W. McBurney, National Bureau of Standards.

Report of Committee C-8 on Refractories. R. A. Heindl, Chairman.

Presents various recommendations respecting specifications and tests for fire brick and other refractory materials under the jurisdiction of the committee. Includes summary of activities of subcommittees. Reports studies being made on standard furnaces for the determination of the P.C.E. value of refractories, and considerations being given to an industrial survey for refractory service conditions in the glass industry.

Report of Committee C-10 on Hollow Masonry Building Units. D. E. Parsons, Chairman.

Recommends adoption as standard of the tentative definitions of terms relating to structural clay tile; also the adoption, with revisions, of the tentative specifications for structural clay load-bearing wall tile, for structural clay non-load-bearing tile, for structural clay floor tile, the specifications and tests for load-bearing concrete masonry units and the methods of sampling and testing structural clay tile. Contains brief statement of topics under consideration in the committee.

Fire Tests of Doors for Buildings. A. S. Williams, E. F. Hartman and R. C. Bastress, Protexol Corp.

Presents results obtained in over fifty fire tests of full-size door assemblies, carried out in a specially constructed testing furnace which was provided with the necessary devices for the measurement of and control of temperature, ventilation, smoke produced, etc. The types of doors tested included fire-retardant wood, metal-clad and hollow-steel construction.

Report of Committee D-7 on Timber. Hermann von Schrenk, Chairman.

Presents new tentative specifications for zinc chloride. Submits a revision of the standard specifications for creosote covering the deletion of the float test requirement; also a proposed revision of the standard specifications for structural wood joist and planks, beams and stringers, and posts and timbers in the form of new tentative specifications.

Report of Committee D-17 on Naval Stores. F. P. Veitch, Chairman.

Brief progress report on activities of subcommittees on viscosity of rosin and on acid and saponification number and unsaponifiable matter.

Report of Committee D-1 on Preservative Coatings for Structural Materials. Allen Rogers, Chairman.

Submits tentative revisions of standard methods of sampling and testing shellac, specifications for lithopone, and method of routine analysis of dry cuprous oxide; and recommends changes in the standard methods of routine analysis of yellow, orange, red and brown pigments containing iron and manganese, and in the methods of routine analysis of yellow and orange pigments containing chromium compounds, blue pigments and chrome green.

Recommends for adoption as standard the tentative specifications for amyl acetate (from fusel oil), the specifications for industrial benzene, toluene and xylene, for high zinc sulfide lithopone, for zinc sulfide, and for titanium dioxide, the tentative method of test for tinting strength of white pigments or pastes, specifications and tests for tricresyl phosphate, and test for mass color and tinting strength of dry pigments or pastes. Proposes adoption of the existing tentative revision of the standard methods of routine analysis of yellow and orange pigments.

Methods of Measuring and Determining Gloss. R. S. Hunter, National Bureau of Standards.

The different characteristics of appearance associated with gloss are discussed and descriptions cover about thirty gloss-measuring instruments according to the characteristics which each measures. The five characteristics of surface appearance are as follows: (1) shininess (mirror reflectance), (2) contrast between high-light areas and adjacent areas, (3) sharpness and distinctness of images reflected in glossy surfaces, (4) "bloom," or reflection haze adjacent to reflected images, and (5) surface texture. Points out the characteristics of various materials, including paints, organic finishes, textiles, paper, ceramic products, metallic finishes, leather and plastics, which are most significant from the standpoint of gloss.

The Testing of Organic Finishes. A. E. Schuh, Bell Telephone Laboratories, Inc.

This paper, illustrated with motion pictures, describes a method of testing organic finishes which depends primarily on the measurement of physical changes that take place in the aging of controlled test panels. The quantitative nature of the various tests permits progressive changes to be measured and makes possible rapid evaluation of serviceability and prognosis of durability. Discusses the significance and operative details of the various tests and points out the desirability of shifting emphasis away from the qualitative exposure or service trial methods of testing towards a more significant and quantitative method of approach.

Miscellaneous Business.

